

Figure 1. Nucleotide sequence of the entire envelope gene for the mutant HBsAg strain:

ATGGGGCAGAATCTTTCCACCAGCAATCCTCTGGGATTCTTTCCCGACCACCAGTTGGAT
CCAGCCTTCAGAGCAAACACCAACAATCCAGATTGGGACTTCAATCCCAACAAGGACAC
CTGGCCAGACGCCAACAAGGTAGGAGCTGGAGCATTCGGACTGGGGTTCACCCACCGC
ACGGAGGCCTTTTGGGGTGGAGCCCTCAGGCTCAGGGCATAACACAAACCTTGCCAGCA
AATCCGCCTCCTGCTTCCACCAATCGCCAGTCAGGAAGGCAGCCTACCCCGCTGTCTCCA
CCTTTGAGAAACACTCATCCTCAAGCCATGCAGTGGAATCCACAACCTTCCACCAAACCT
CTGCAAGATCCCAGAGTGAGAGGTCTGTATTTCCCTGCTGGTGGCTCCAGTTCAGGAACAG
TAAACCCTGTTCCGACTACTGTCTCTCCCATATCGTCAATCTTCTCGAGGATTGGGGACC
CTGCGCGGAACATGGAGAACATCACATCAGGATTCTAGGACCCCTGCTCGTGTTACAG
GCGGGGTTTTTCTTGTTGACAAGAATCCTCACAATACCGCAGAGTCTAGACTCGTGGTG
GACTTCTCTCAATTTTCTAGGGGGAACCTACCGTGTGTCTTGGCCAAAATTCGCAGTCCC
CAACCTCCAATCACTACCAACCTCCTGTCTCCAACCTTGTCTGTTATCGCTGGATGT
GTCTGCGGCGTTTTATCATCTTCCTCTTCATCCTGCTGCTATGCCTCATCTTCTTGTGGT
TCTTCTGGACTATCAAGGTATGTTGCCCGTTTGTCTCTAATTCCAGGATCTTCAACCAC
CAGCACGGGACCATGCAGAGCCTGCACGACTCCTGCTCAAGGAACCTCTATGTATCCCT
CCTGTTGCTGTACAAAACCTTCGGATGGAACTGCACCTGTATTCCCATCCCATCATCCT
GGGCTTTCGGAAAATTCCTATGGGAGTGGGCCTCAGCCCGTTTCTCCTGGCTCAGTTTAC
TAGTGCCATTTGTTTCAGTGGTTCGTAGGGCTTTCCTCCACTGTTTGGCTTTCAGTTATATG
GATGATGTTGTACTGGGGGCCAAGTCTGTACACCATCTTGAGTCCCTTTTACCGCTGTT
ACCAATTTTCTTTTGTCTTTGGGTATACATTTAAACCCTAATAAA

Figure 2. Amino acid sequence of the entire envelope gene for the mutant HBV strain:

[preS1]MGQNLSTSNPLGFFPDHQLDPAFRANTNNPDWDFNPNKDTWPDANKVGAGAFGL
GFTPPHGGLLGWSPQAQGITQTLPANPPPASTNRQSGRQPTPLSPPLRNTHPQA

[preS2]MQWNSTTFHQTLQDPRVRGLYFPAGGSSSGTVNPVPTTVSPISSIFSRIGDPARN

[S]M₁ENITSGFLG₁₀PLLVLQAGFF₂₀LLTRILTIPQ₃₀SLDSWWTSLN₄₀FLGGTTVCLG₅₀QNSQS
PTSNH₆₀SPTSCPPTCP₇₀GYRWMCLRRF₈₀IIFLLILLC₉₀LIFLLVLLDY₁₀₀QGMLPVCPLI₁₁₀PGS
STTSTGP₁₂₀CRACTTPAQG₁₃₀TSMYPSCCCT₁₄₀KPSDGNCTCI₁₅₀PIPSSWAFGK₁₆₀FLWEWASA
RF₁₇₀SWLSLLVPFV₁₈₀QWFGVLSPTV₁₉₀WLSVIWMMLY₂₀₀WGPSLYTILS₂₁₀PFLPLLPIFF₂₂₀CL
WVYI.

subtype ayw2, genotype D

Three S substitutions found:

- 1.) Thr to Ala 123 (affects H166 epitope)
- 2.) Trp to Leu 199 (outside "a" determinant)
- 3.) Ser to Thr 207 (outside "a" determinant)

Figure 3. Nucleotide sequence of the small envelope gene for wild type HBV ayw₂:

ATGGAGAACATCACATCAGGATTCCCTAGGACCCCTGCTCGTGTTACAGGCGGGGTTTT
TCTGGTTGACAAGAATCCTCACAATACCGCAGAGTCTAGACTCGTGGTGGACTTCTCTC
AATTTTCTAGGGGGAACCTACCGTGTGTCTTGGCCAAAATTTCGCAGTCCCCAACCTCCAA
TCACTCACCAACCTCCTGTCTCCAACCTTGTCTGGTTATCGCTGGATGTGTCTGCGGC
GTTTTATCATCTTCCTCTTCATCCTGCTGCTATGCCTCATCTTCTTGTGGTTCTTCTGGA
CTATCAAGGTATGTTGCCCGTTTGTCTCTAATTCCAGGATCATCAACCACCAGCACGG
GACCCTGCAGAACCTGCACGACTCCTGCTCAAGGAACCTCTATGTATCCCTCCTGTTGC
TGTACAAAACCTTCGGATGGAAACTGCACCTGTATTCCCATCCCATCATCCTGGGCTTT
CGGAAAATTCCTATGGGAGTGGGCCTCAGCCCGTTTCTCTTGGCTCAGTTTACTAGTGC
CATTTGTTCAGTGGTTCGTAGGGCTTTCCCCCACTGTTTGGCTTTCAGTTATATGGATGA
TGTGGTATTGGGGGCCAAGTCTGTACAGCATCTTGAGTCCCTTTTTACCGCTGTTACCA
ATTTTCTTTTGTCTTTGGGTATACATTAA

Figure 4. Translated nucleotide sequence of the small envelope gene for the mutant HBV strain (1st sequence) and for wild type HBV ayw₂ (third sequence). Differences in sequence are underlined.

S sequence-->

GCG CGG AAC |ATG GAG AAC ATC ACA TCA GGA TTC CTA GGA CCC CTG CTC GTG TTA CAG GCG
 A R N M E N I T S G F L G P L L V L Q A
 GCG CTG AAC |ATG GAG AAC ATC ACA TCA GGA TTC CTA GGA CCC CTG CTC GTG TTA CAG GCG

GGG TTT TTC TTG TTG ACA AGA ATC CTC ACA ATA CCG CAG AGT CTA GAC TCG TGG TGG ACT
 G F F L L T R I L T I P Q S L D S W W T
 GGG TTT TTC TTG TTG ACA AGA ATC CTC ACA ATA CCG CAG AGT CTA GAC TCG TGG TGG ACT

TCT CTC AAT TTT CTA GGG GGA ACT ACC GTG TGT CTT GGC CAA AAT TCG CAG TCC CCA ACC
 S L N F L G G T T V C L G Q N S Q S P T
 TCT CTC AAT TTT CTA GGG GGA ACT ACC GTG TGT CTT GGC CAA AAT TCG CAG TCC CCA ACC

TCC AAT CAC TCA CCA ACC TCC TGT CCT CCA ACT TGT CCT GGT TAT CGC TGG ATG TGT CTG
 S N H S P T S C P P T C P G Y R W M C L
 TCC AAT CAC TCA CCA ACC TCC TGT CCT CCA ACT TGT CCT GGT TAT CGC TGG ATG TGT CTG

CGG CGT TTT ATC ATC TTC CTC TTC ATC CTG CTG CTA TGC CTC ATC TTC TTG TTG GTT CTT
 R R F I I F L F I L L L C L I F L L V L
 CGG CGT TTT ATC ATC TTC CTC TTC ATC CTG CTG CTA TGC CTC ATC TTC TTG TTG GTT CTT

CTG GAC TAT CAA GGT ATG TTG CCC GTT TGT CCT CTA ATT CCA GGA TCI TCA ACC ACC AGC
 L D Y Q G M L P V C P L I P G S S T T S
 CTG GAC TAT CAA GGT ATG TTG CCC GTT TGT CCT CTA ATT CCA GGA TCA TCA ACC ACC AGC

ACG GGA CCA TGC AGA GCC TGC ACG ACT CCT GCT CAA GGA ACC TCT ATG TAT CCC TCC TGT
 T G P C R A C T T P A Q G T S M Y P S C
 ACG GGA CCC TGC AGG ACC TGC ACG ACT CCT GCT CAA GGA ACC TCT ATG TAT CCC TCC TGT

T
 TGC TGT ACA AAA CCT TCG GAT GGA AAC TGC ACC TGT ATT CCC ATC CCA TCA TCC TGG GCT
 C C T K P S D G N C T C I P I P S S W A
 TGC TGT ACA AAA CCT TCG GAT GGA AAC TGC ACC TGT ATT CCC ATC CCA TCA TCC TGG GCT

TTC GGA AAA TTC CTA TGG GAG TGG GCC TCA GCC CGT TTC TCC TGG CTC AGT TTA CTA GTG
 F G K F L W E W A S A R F S W L S L L V
 TTC GGA AAA TTC CTA TGG GAG TGG GCC TCA GCC CGT TTC TCI TGG CTC AGT TTA CTA GTG

CCA TTT GTT CAG TGG TTC GTA GGG CTT TCC CCC ACT GTT TGG CTT TCA GTT ATA TGG ATG
 P F V Q W F V G L S P T V W L S V I W M
 CCA TTT GTT CAG TGG TTC GTA GGG CTT TCC CCC ACT GTT TGG CTT TCA GTT ATA TGG ATG

ATG TTG TAC TGG GGG CCA AGT CTG TAC ACC ATC TTG AGT CCC TTT TTA CCG CTG TTA CCA
 M L Y W G P S L Y T I L S P F L P L L P
 ATG TGG TAT TGG GGG CCA AGT CTG TAC AGC ATC TTG AGT CCC TTT TTA CCG CTG TTA CCA

W S
 ATT TTC TTT TGT CTT TGG GTA TAC ATT TAA
 I F F C L W V Y I .
 ATT TTC TTT TGT CTT TGG GTA TAC ATT TAA

Figure 5. Nucleotide sequence 492 to 675 encoding the “a” determinant for the mutant HBV strain.

T₄₉₂AT CAA GGT ATG TTG CCC GTT TGT CCT CTA ATT CCA GGA TCT TCA ACC ACC AGC

ACG GGA CCA TGC AGA G₅₆₁CC TGC ACG ACT CCT GCT CAA GGA ACC TCT ATG TAT CCC TCC TGT

TGC TGT ACA AAA CCT TCG GAT GGA AAC TGC ACC TGT ATT CCC ATC CCA TCA TCC TGG GCT

TTC GGA AAA₆₇₅

Figure 5. Nucleotide sequence 492 to 675 encoding the “a” determinant for the mutant HBV strain.

Figure 6. Amino acid sequence of the “a” determinant for the mutant HBV strain:

Y₁₀₀QGMLPVCPLI₁₁₀PGSSTTSTGP₁₂₀CRACTTPAQG₁₃₀TSMYPSCCCT₁₄₀
KPSDGNCTCI₁₅₀PIPSSWAFGK₁₆₀